

# EXHIBIT 71

## **ENRIQUE TRIANA, Ph.D, P.E.**

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### **PROFILE**

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I am an expert in Water Resources Engineering with more than 15 years of progressive experience in academia, research and implementation of innovative solutions in water resources planning and management. In this field, I am one of the most talented engineers in development and application of computational Spatial Decision Support Systems (SDSS). In addition to my strong theoretical and practical water resource engineering background, my success in development of SDSS is based on combining my experience in development of water resources modeling tools such as MODSIM, computer and databases programming skills, proficiency and expertise in spatially-based solutions using ArcObjects programming and the application of state-of-the-art computational tools such as Artificial Neural Networks and multi-objective optimization to complex processes. Application of these SDSS enhance the understanding of complex dynamics in river basins, promote communication and facilitate stakeholders' decision making for better and sustainable utilization of the water resources.

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### **EDUCATION**

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#### ***Ph.D. IN CIVIL AND ENVIRONMENTAL ENGINEERING 05/17/2008***

*Water Resources Planning & Management / Groundwater*

*GPA 4.0/4.0*

Research focused on development and application of a Spatial Decision Support System (GeoDSS) for river basin planning and management. GeoDSS features innovative conjunctive surface and groundwater, quantity and quality modeling, integrating state-of-the-art technologies (MODSIM, MODFLOW, GIS and Artificial Neural Networks). GeoDSS was applied to the Lower Arkansas River basin, Colorado, for evaluation of salinity management scenarios and the Imperial Irrigation District, California, for water conservation analysis.

Colorado State University, Fort Collins, Colorado

#### ***M.S. IN CIVIL ENGINEERING 08/07/1999***

*Water Resources Planning & Management*

*GPA 3.9/4.0*

Colorado State University, Fort Collins, Colorado

#### ***B.E. IN CIVIL ENGINEERING 08/24/1995***

*Hydraulics and Hydrology*

*GPA 3.9/5.0 - Class Rank: 1*

Colombian School of Engineering, Bogotá, Colombia

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### **PROFESSIONAL REGISTRATION**

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**PROFESSIONAL ENGINEER – COLORADO**

**REGISTERED CIVIL ENGINEER – COLOMBIA**

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**PROFESSIONAL EXPERIENCE**


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**ADJOINT FACULTY****1/20/2013 - TO PRESENT***Dept. of Civil Engineering, Colorado State University, Ft. Collins, Colorado (Part Time)*

- Teach Object Oriented GIS Programming for Engineers graduate class. Part of the Master of Engineering program in Geospatial Engineering.

**LEAD WATER RESOURCES ENGINEER****11/03/2010 - TO PRESENT***MWH Global, Fort Collins, Colorado**(Full Time)*

- Conduct, supervise and revise technical work in the areas of water resources planning, water resources modeling, environmental permitting, environmental assessments, hydrology, hydraulics, water quality analysis and groundwater management for projects in the Rocky Mountain Region
- Develop and apply MODSIM-based Spatial Decision Support Systems for water supply planning for a variety of applications, including municipal, mining, agricultural and environmental water supply analyses.
- Supervise day-to-day operations of Fort Collins, CO Water Resources Group Staff.
- Responsible for coordinating day-to-day work activities, reviewing and approving expense reports, performing annual Performance Track annual reviews and providing technical guidance and review.
- Perform project management activities (budget and schedule tracking, project reporting) for specific project tasks
- Assist with proposal preparation and other marketing activities
- Develop and maintain contacts with current and potential water resources clients in Colorado
- Support Colorado Mining Group in hydrology, hydraulics and water resources management projects
- Support water resources projects in other MWH offices in the United States and internationally.

**WATER RESOURCES ENGINEER - SENIOR GIS SPECIALIST****02/04/2008 - 11/02/2010***AECOM, Denver, Colorado**(Full Time)*

- Apply Spatial Decision Support Systems to Water Resources Systems for water rights market evaluation, climate change impacts in water availability and water rights analysis, using CDSS (StateMOD, StateCU, TStools, StateDMI), Geo- MODSIM , Geo-MODFLOW, and ArcGIS.
- Perform Spatial Hydrologic and Hydraulic modeling, employing HEC-GeoHMS, FLO2D, HEC-GeoRAS, H2ONET and ArcGIS, for flood inundation mapping, dam breach analysis, Alluvial fan flow modeling, pressurized system modeling and energy dissipation structures evaluation.
- Assist in writing proposals in the areas of water resources planning, hydrologic modeling and spatial data management.
- Serve as project manager and participate in business development activities, including client relations and development of in-house software tools for spatial data management, water rights processing and reservoir systems simulation.

**WATER RESOURCES RESEARCH ASSOCIATE** **05/01/2003 -0 4/30/2008**

*Dept. of Civil Engineering – Colorado State Univ., Ft. Collins, Colorado (Part Time: 20h/w)*

- Developed GeoDSS, a Spatial Decision Support System that combines Geo-MODSIM, Geo-MODFLOW, GIS and Artificial Neural Networks (ANN) for conjunctive surface and ground water system planning and management. Developed a GeoDSS water quality module to analyze effects of water management alternatives in the surface-groundwater system.

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- Applied GeoDSS to the Lower Arkansas River in Colorado to evaluate implementation of strategies for recovery of a salinity-threatened irrigation valley in a highly constrained environment.
- Developed, implemented and applied the Model Subsystem of the Imperial Irrigation District, CA, Decision Support System, using a customized version of GeoDSS. Worked as part of the consulting team developing the IID definite conservation plan.
- Developed enhancements and maintain the CSU-MODSIM water resources modeling program. Coordinate and manage the MODSIM development team. Implement the “Back-Routing” logic in MODSIM for accurate system simulation of flow routing in short time steps.
- Developed Geo-MODSIM, a geo-referenced extension of MODSIM in ArcGIS.
- Imparted technical training in Advanced MODSIM Modeling to Boyle Engineering (Denver, Jan 2007)
- Provided Training and Support in MODSIM modeling and MODSIM Customization using .NET to KOWACO (Korea, Nov 2005).

**INTERNATIONAL WATER RESOURCES CONSULTANT**

**08/01/2005 -04/30/2006**

*Colombian School of Engineering, Bogotá, Colombia*

*(Part Time)*

- Developed a Decision Support System (DSS) for optimal operation of Bogotá Water Supply System (Bogotá’s Water and Sewer Company - EAAB).
- Trained the EAAB personnel in Water Resources Systems Modeling using MODSIM.

**GRADUATE RESEARCH ASSISTANT**

**01/01/2002 -0 4/30/2003**

*Colorado State University, Fort Collins, Colorado*

*(Part Time: 20h/w)*

- Designed and implement an innovative conjunctive surface and ground water modeling system combining MODFLOW modeling with Artificial Neural Networks.
- Design and develop the database subsystem for the Lower Arkansas River Decision Support System Prototype (Colorado).

**GRADUATE TEACHING ASSISTANT**

**08/15/2001 -12/31/2001**

*Dept. of Civil Engineering. Colorado State University, Ft. Collins, Colorado*

*(Part Time)*

- Taught surveying laboratories (Practice and theory) to first year Civil Engineering students.

**ASSOCIATE INSTRUCTOR**

**08/01/1999 - 07/31/2001**

*Colombian School of Engineering, Bogotá, Colombia*

*(Full Time)*

- Civil Engineering Curriculum Instructor & Member of the Hydraulics Studies Center.
- Taught Fluid Mechanics, Pipes and Channels Hydraulics and Dynamic Programming.
- Conducted research in water resources systems optimization and management.

**RESEARCH ASSISTANT****08/01/1997 - 06/30/1999***Colorado State University, Fort Collins, Colorado**(Part Time: 20h/w)*

- Developed a graphical user interface in Visual Basic for the General Dynamic Programming Package (CSUDP).
- Developed a DSS to perform optimal reservoir operation using Dynamic Programming.

**ASSISTANT INSTRUCTOR****07/01/1995 - 07/31/1997***Colombian School of Engineering, Bogotá, Colombia**(Full Time)*

- Civil Engineering Curriculum Instructor & Member of the Hydraulics Studies Center.
- Director of the Hydraulics Laboratory.
- Taught Basic Physics to freshman engineering students.
- Conducted research in Numerical Methods and Un-Steady Flow Hydraulics.
- Developed academic software (VB language) to teach hydraulics at the laboratory.

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**TECHNICAL SKILLS**


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- Leading knowledge in design and implementation of computational Spatial Decision Support Systems for Water Resources Planning and Management.
  - Outstanding computer programming skills for water resources analysis using VB.NET, C#, Visual Basic, Excel (VBA), MATLAB, SQL, and C languages. Knowledge in Fortran, Perl, Python and C++.
  - Experience using Geographic Information System (ArcGIS). Expertise in advance Arc-Objects programming and custom GIS tools development.
  - Experience using water engineering software such as MODSIM, CSUDP, MODFLOW, StateMOD, Colorado Decision Support Systems (CDSS) tools and Database, HEC-RAS, HEC-HMS, FLO2D, and H2ONet. Experience in MATLAB and STATISTICA. Basic knowledge in other water resources software such as CSU-SAMS, RiverWare, MIKEBASIN, Basins, CALSIM, SWMM and AutoCAD.
  - Experience in designing, programming and utilizing Database Systems, including SQL Server and MS-Access.
  - Expertise and knowledge in applying Artificial Neural Networks, Dynamic Programming, Fuzzy Logic, and Genetic Algorithms to Water Resources Applications.
  - Experience operating computers under Windows (98, NT, XP and VISTA) and Linux.
  - Expertise in the use of productivity software such as: Word, Excel, Power Point, LATEX.
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**LANGUAGE ABILITY**

<b>ENGLISH</b>	FLUENT IN CONVERSATION, READING AND WRITING
<b>SPANISH</b>	<i>NATIVE LANGUAGE</i>

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**SELECTED PUBLICATIONS/PRESENTATIONS**

**GIS-BASED DECISION SUPPORT SYSTEM FOR IMPROVED OPERATIONS AND EFFICIENCY CONSERVATION IN LARGE-SCALE IRRIGATION SYSTEMS.** 2012. *J. Irrig. Drain Eng.*, 138(10), 857-867. doi: 10.1061/(ASCE)IR.1943-4774.0000481

**USE OF A RIVER BASIN SIMULATION MODEL AND DECISION SUPPORT SYSTEM TO EVALUATE WATER SUPPLY ALTERNATIVES FOR A PLANNED MINE EXPANSION IN AN ARID REGION OF SOUTHERN PERU.** 2011. AWRA Annual Conference. Albuquerque, New Mexico.

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*21ST CENTURY WATER SUPPLY PLANNING FOR UTILITY MANAGERS*. 2011.

RMSAWWA/RMWEA Joint Annual Conference. Loveland, Colorado

*NEURAL NETWORK APPROACH TO STREAM-AQUIFER MODELING FOR IMPROVED RIVER BASIN MANAGEMENT*. 2010. Journal of Hydrology, doi: 10.1016/j.jhydrol.2010.07.024

*"RIVER GEODSS FOR AGRO-ENVIRONMENTAL ENHANCEMENT OF COLORADO'S LOWER ARKANSAS RIVER BASIN. I: MODEL DEVELOPMENT AND CALIBRATION"*. 2010. Journal of Water Resources Planning and Management, ASCE. Vol 135 No.2, 177 - 189.

*"RIVER GEODSS FOR AGRO-ENVIRONMENTAL ENHANCEMENT OF COLORADO'S LOWER ARKANSAS RIVER BASIN. II: EVALUATION OF STRATEGIES"*. 2010. Journal of Water Resources Planning and Management, ASCE. Vol 135 No.2, 190 - 200.

*"GEO-SPATIAL MODELING SOLUTIONS TO COMMUNICATE WATER RESOURCES ALTERNATIVES TO DECISION-MAKERS"*. 2009. Colorado Water Congress. Denver, Colorado.

*"IMPERIAL IRRIGATION DISTRICT EFFICIENCY CONSERVATION DEFINITE PLAN: DECISION SUPPORT SYSTEM FOR EVALUATING ALTERNATIVES"*. 2008 USCID Water Management Conference, Scottsdale, Arizona

*"GEO-MODSIM: SPATIAL DECISION SUPPORT SYSTEM FOR RIVER BASIN MANAGEMENT"* 6/2007. 2007 ESRI International User Conference, San Diego, California

*"APPLICATION OF GEO-MODSIM TO WATER QUANTITY AND QUALITY MANAGEMENT IN THE LOWER ARKANSAS RIVER BASIN, COLORADO"* 5/2006. 2006 Spring Specialty Conference GIS and Water Resources IV. AWRA, Houston, Texas

*"COMBINING A RIVER BASIN NETWORK FLOW MODEL AND ARTIFICIAL NEURAL NETWORKS FOR SALINITY CONTROL IN AN IRRIGATED VALLEY"* 5/2005. World Water and Environmental Resources Congress. ASCE-EWRI, Anchorage, Alaska

*"CONJUNCTIVE STREAM-AQUIFER MODELING USING ARTIFICIAL NEURAL NETWORKS"* 6/2003. World Water and Environmental Resources Congress. ASCE-EWRI, Philadelphia, Pennsylvania

*"DECISION SUPPORT SYSTEM FOR OPTIMAL RIVER BASIN MANAGEMENT"* 8/2000. Joint conference of water resources planning and management. ASCE, Minneapolis, Minnesota

*"SOFTWARE FOR TEACHING BASIC HYDRAULICS"* 6/1996. XII national hydraulics and hydrology seminar, Bogotá, Colombia

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#### OTHER EDUCATIONAL EXPERIENCES

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<i>CERTIFICATE ON ADVANCED ARCOBJECTS COMPONENT DEVELOPMENT II</i>	<i>AUG/2003</i>
ESRI - Environmental System Research Institute, Denver, Colorado	
<i>PROJECT MANAGEMENT BOOTCAMP I</i>	<i>SEP/2008</i>
PSMJ Resources Inc., Denver, Colorado	
<i>PROJECT MANAGEMENT PRINCIPLES</i>	<i>MAR/2011</i>
MWH University, Bromfield, Colorado	

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## INVOLVEMENT IN COOPERATION AGREEMENTS

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### ***MODSIM MODEL DEVELOPMENT AGREEMENT, COLORADO STATE UNIVERSITY AND MWH***

MWH and Dr. Triana are recognized as experts in the MODSIM modeling system and maintain a MODSIM development agreement with Colorado State University that allows MWH to collaborate in the development, enhancement and maintenance of the MODSIM source code for clients and business partners while contributing with the model future and reliability. With this agreement, MWH exalts its involvement in the professional community with our leading role in peer reviewing, input and participation in development of Water Resources Planning tools.

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## AWARDS

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*H.W. SHEN WATER RESOURCES GRADUATE AWARD (2002-2003)*

*TRIPTON AND KALMBACH GRADUATE FELLOWSHIP (2001-2002)*

*AWRA-COLORADO SECTION'S RICH HERBERT MEMORIAL SCHOLARSHIP (2004-2005)  
(2005-2006)*

*1<sup>ST</sup> PLACE IN THE STUDENT PRESENTATION CONTEST AT THE AWRA 2006 SPRING SPECIALTY CONFERENCE - GIS AND WATER RESOURCES IV (MAY 2006 - HOUSTON, TEXAS)*

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## PEER REVIEWER

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*JOURNAL OF HYDROLOGIC ENGINEERING* *08/20/2011*

- Comparing the performance of empirical black-box models for river flow forecasting in the Heihe River Basin Northwest, China.

*JOURNAL OF HYDROLOGY* *08/22/2006*

- A Numerical Modeling and Neural Network Approach to Estimate the Impact of Groundwater Abstractions on River Flows.

*JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT* *10/16/2002*

- Modeling Nitrate Concentration in Natural Streams by Using Artificial Neural Networks.

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## ORGANIZATIONS

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*MEMBER OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)*

*MEMBER OF THE AMERICAN WATER RESOURCES ASSOCIATION (AWRA)*

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## REFERENCES

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Excellent references provided upon request.